

REMARKS

Claims 8-13, 15-18, 20-24 and 28-30 were pending in the application. Claims 1-7, 14, 19 and 25-27 were cancelled in previous amendments. In the above amendments, claims 13 and 18 are amended in accordance with the Office Action's suggestion. Claims 31 to 44 are newly presented. A listing of the new claims, and the claims upon which they are based, is given below:

New claim 31 is based on claims 4 and 5.

New claim 32 is based on claim 6.

New claim 33 is based on claim 7.

New claim 34 is supported by the description on page 13, paragraph 1043, first sentence.

New claim 35 is supported by the description on page 13, paragraph 1043, fifth sentence.

New claim 36 is based on claim 8.

New claim 37 is based on claim 9.

New claim 38 is based on claim 10.

New claim 39 is based on claim 16.

New claim 40 is based on claim 17

New claim 41 is based on claims 1, 4, 5, 14.

New claim 42 is based on claim 2.

New claim 43 is based on claim 11.

New claim 44 is based on claim 12.

Applicant provides argumentation below in support of the patentability of all pending claims.

The amendments are fully supported in the specification, so no new matter is added. Therefore, after entry of the above amendments, claims 8-13, 15-18, 20-24, and 28-44 are now

pending for reconsideration. Applicant believes that the present application is now in condition for allowance, which is respectfully requested.

Summary of the Office Action dated December 21 2009

Claims 13 and 18 were objected to, because of informalities.

Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over DeMartin (US Pat. 6,421,527) and Ling (US Pat. 5,216,692) further in view of Kamel et al. (US Pat. 6,285,886). Claims 8-9, 11, 15-17, 20-21, 23, 28-29 were rejected under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu et al [US Pat: 5,905,742] and Kamel further in view of Ling.

Claims 10, 22, 24 and 30 were rejected under 35 U.S.C. § 103(a) as being dependent upon a rejected base claim, but indicated that these claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant thanks the Office Action for indicating that claims 10, 22, 24 and 30 would be allowable if rewritten in independent form.

The rejections and objections are respectfully traversed in light of the foregoing amendments and the following remarks. The main paragraph numbers in the Applicant's remarks correspond to the numbering of paragraphs in the Office Action.

Response to Objection to Claims 13, 18

4. The Office Action objected to claims 13 and 18 and directed that the phrase "a memory storage unit adapted to store a plurality of computer-readable instructions" should be changed. Applicant acknowledges the objection and requests that the claim be amended as directed by the Office Action to read "a memory storage unit storing a plurality of computer-readable instructions". Since the Office Action indicated this amendment would make the claims allowable, Applicant respectfully request that claims 13 and 18 be allowed once amended.

Response to Rejections of Claims 8-9, 11-12, 15-17, 20, 21, 23, 28 and 29 and Objection to Claims 10, 22, 24, 30

Response to Rejection of Claims 8-9, 11-12, 15-17, 20, 21, 23, 28 and 29

6. Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over DeMartin (US Pat. 6,421,527) and Ling (US Pat. 5,216,692) further in view of Kamel et al. (US Pat. 6,285,886)

6A) The Office Action stated that DeMartin disclosed a base station operative to receive signals including a quality message with a parity check at a first rate (differential coding for channel measurement with 1 bit parity check for different channel grade, col 6, lines 1-43, Fig 1), and differential indicators at a second rate (channel grade indicators).

The applicant respectfully disagrees with the Office Action. Claim 12 has the features:

“...receive signals on a reverse link, including a quality message with a parity check at a first rate, and differential indicators at a second rate...”

DeMartin describes the use of a down-link channel measurement bit which is applied to an encoder in a mobile station (col.6, lines1 to 10). The downlink channel measurement bit is not a quality message because it is only one bit and so can only contain two-state information limited to yes/no, or up/down etc and therefore cannot provide a quality metric which may provide various information such as C/I or DRC.

Even if the down-link channel measurement bit were interpreted as a quality message, there is no mention of a parity check in DeMartin, whereas claim 12 recites: “receive circuitry operative to receive signals on a reverse link, including a quality message with a parity check at a first rate”. Neither is the down-link channel measurement bit the same as the differential indicators of claim 12 as claimed because the differential indicators track the quality metric between successive quality messages, and DeMartin does not describe this feature.

DeMartin describes a codec mode command which is not a quality message or a differential indicator because it is sent by the base station (and not by the mobile station) and serves to command the mobile station to change the codec mode. Whereas the quality message of claim 12 is for periodically providing a quality metric of a forward link, and the differential indicators track the quality metric between successive quality messages.

DeMartin describes a repetition code identifying the codec mode of the frame. The repetition code is not a quality message or a differential indicator because the quality message is for periodically providing a quality metric of a forward link, and the differential indicator is for tracking the quality metric between successive quality messages, but the repetition code is not described as being for either of these functions but is for identifying the codec mode of the frame.

DeMartin also describes a codec mode beacon (CMB) which keeps repeating the codec mode currently in use (col.6, lines 54-58). The codec mode beacon is not a quality message or a differential indicator because “the quality message periodically provid[es] a quality metric of a forward link, wherein the differential indicators track the quality metric between successive quality messages”, but the codec mode beacon of DeMartin is not described as being for either of these functions and is for repeating the codec mode currently in use.

DeMartin also describes the use of a 1-bit up-link codec mode command which is not a quality message or a differential indicator for the same reasons as above, and is from a base station (and therefore on a forward link and not on a reverse link as in the claim).

Therefore in the light of the above, DeMartin lacks the claimed features because DeMartin does not disclose the use of a quality message or a differential indicator or a parity check as claimed in claim 12.

6B) The Office Action states that DeMartin disclosed “differential indicators track the quality metric between successive quality messages”.

The applicant respectfully disagrees with the Office Action. Claim 12 has the features:

“the quality message periodically providing a quality metric of a forward link, wherein the differential indicators track the quality metric between successive quality messages.”

DeMartin describes a down-link channel measurement bit but does not mention the use of quality messages. Even if differential indicators are interpreted as being equivalent to the down-link channel measurement bit of DeMartin, this is not the same as a quality message because the quality message periodically provides a quality metric of the forward link whereas the

differential indicators track the quality metric between successive quality messages (claim 12) and are therefore different than the quality messages. Also, the arguments in section 6A above apply equally to this section.

Therefore DeMartin does not disclose the use of a quality message or a differential indicator as claimed in claim 12.

6C) The Office Action states that DeMartin disclosed:

“a memory storage unit operative to store a quality message received on the reverse link.”

The applicant respectfully disagrees with the Office Action. DeMartin describes the use of a moving average filter (63) of memory size 40, which averages over 40 frames. This is plainly different than the claimed feature of a memory storage unit operative to store a quality message received on the reverse link, because the memory of DeMartin is described as being for a moving average filter and is not described as being for storing a quality message received on the reverse link, as in claim 12.

6D) The Office Action states that DeMartin disclosed “a differential analyzer to update the quality message stored in the memory storage unit in response to the differential indicators and the parity check”.

The applicant respectfully disagrees with the Office Action.

As explained above (section 6A), DeMartin does not disclose the use of a quality message or a differential indicator as claimed in claim 12.

Furthermore, DeMartin describes averaging over a frame of absolute values of soft values and then encoding the measure with delta modulation, and the use of the 1-bit uplink codec mode command mentioned above. This is not the same as updating the quality message stored in the memory storage unit in response to the differential indicators and parity check, because the quality message and differential indicators are used together to provide updated channel quality information, whereas the codec mode command is for indicating a codec mode to use.

Therefore DeMartin does not disclose:

“a differential analyzer to update the quality message stored in the memory storage unit in response to the differential indicators and the parity check.”

6E) The Office Action admits, and Applicant agrees, that DeMartin fails to positively disclose:

“the quality message periodically providing a quality metric of a forward link, wherein the differential indicators track the quality metric between successive quality messages”.

The Office Action states that these features are however in Ling. Applicant respectfully disagrees with the Office Action in this respect.

Ling describes the estimating of received power, and the transmitting of a power control indicator which can be set to one or zero depending on whether transmitted power is to be increased or decreased.

This is different to the use of a quality message in combination with a differential indicator as in claim 12. DeMartin and Ling are both concerned with simple 1-bit closed-loop power control. There is nothing in DeMartin or Ling to suggest the use of a quality message either instead of, or additional to, the 1-bit power control of DeMartin. The skilled person who, having consulted DeMartin, then consulted Ling would simply find a similar power control method as found in DeMartin.

The Office Action appears to equate ‘quality message’ to ‘indicator’. Applicant submits that these terms are used in claim 12 to denote different entities. The quality message is at a first rate and periodically provides a quality metric of a forward link. The differential indicators are at a second rate and track the quality metric between successive quality messages. The advantages of being able to use both a quality message and a differential indicator, as claimed, include:

the quality message may be sent periodically to reduce the reverse link loading;

the transmitter is provided with frequently updated channel condition information;

the use of a differential indicator eliminates the need to frequently or continuously transmit the entire C/I; and

the quality message may tolerate relatively large latencies and can correct synchronization disparity between the base station and remote station.

None of these advantages can be obtained by combining features described in the cited documents, when the documents are consulted either singly or in combination.

6F) The Office Action admits that “DeMartin and Ling fail to disclose determining a first transmission rate for transmission of quality messages and a second transmission rate for transmitting differential indicators”, but states that Kamel discloses these features.

The applicant respectfully disagrees. Claim 12 recites “receive signals on a reverse link, including a quality message with a parity check at a first rate, and differential indicators at a second rate”. Kamel describes the use of first and second incremental changes in transmit power of a base station. These two sets of features are clearly not the same. The quality message and differential indicators together provide updated link quality information, whereas the first and second incremental changes in transmit power are for changing the power level of two respective signals.

Therefore it follows that DeMartin, Ling, and Kamel each fail to disclose “receive signals on a reverse link, including a quality message with a parity check at a first rate, and differential indicators at a second rate”.

Furthermore, in Kamel, the power control can only be associated with one rate (9.6Kbps), not two different rates, and the control channel is not for power control but the power control is for the control channel, because downlink power control is needed to operate continuously on the control channel.

In view of the above arguments, Applicants respectfully submit that the person of average skill could not obtain the features of claim 12 by drawing upon the combined teachings of DeMartin, Ling, and Kamel. Therefore claim 12 is both novel and non-obvious and should be allowed.

7. The Office Action rejected claims 8-9,11, 15-17, 20-21,23, 28-29 under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu et al [US Pat: 5,905,742] and Kamel et al [US Pat: 6,285,886] further in view of Ling [US Pat: 5,216,692].

7A) Regarding claims 8, 11, 28:

7A1) The Office Action states that Chennakeshu discloses the features of:

“estimating a channel condition over a first time window; comparing the estimated channel condition to a first threshold value; transmitting differential indictors with quality messages.”

The applicant respectfully disagrees with the Office Action. Claim 8 reads:

“In a wireless communication system, a method comprising:

estimating a channel condition over a first time window;

comparing the estimated channel condition to a first threshold value;

determining a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators based on the comparison;

transmitting quality messages at the first transmission rate; and

transmitting differential indictors independently of quality messages at the second transmission rate.”

There is no mention of a time window in Chennakeshu. Chennakeshu is directed to symbol decoding which is in a different field to that of the claimed features (channel quality feedback), and so the skilled person would not consult Chennakeshu either as a starting point or as a second reference, when seeking to improve channel quality feedback.

Nonetheless, if he did consult Chennakeshu, Chennakeshu describes: a receiver; a channel quality indicator; ways of measuring the channel quality indicator; a threshold for the

channel quality indicator; a differential encoder; and setting a value of M based on comparing channel quality with the threshold wherein M is a variable number of survival paths upon which trellis decoding is based.

The differential encoder of Chennakeshu is for encoding a signal to be transmitted (col.6 lines 30-32). This is not the same as the differential indicators of claim 8 which track the quality metric between successive quality messages.

The value of M is a variable number of survival paths for a trellis decoder (col.7, lines 49-59), which is not the same as comparing the estimated channel condition to a first threshold value for determining a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators.

Therefore the above features of Chennakeshu do not correspond to the features of claims 8, 11, 28.

7A 2) The Office Action states, and Applicants agree, that the features of determining a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators are not disclosed by Chennakeshu.

The Office Action states these features are however disclosed by Kamel. Applicants respectfully disagree with the Office Action in this respect.

With reference to 6 (F) above, Kamel describes a first and a second incremental change in power, which is different than a first and second rate for transmission.

Therefore, Kamel does not disclose “determining a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators”.

7A3) The Office Action admits, and Applicant agrees, that both Chennakeshu and Kamel fail to positively disclose:

“wherein transmitting differential indicators based on the comparison and transmitting differential indicators independently of quality messages”.

The Office Action states that Ling disclosed:

“a method for transmitting the differential indicators with quality messages”

Applicant respectfully disagrees with the Office Action.

Claim 8 includes: “transmitting differential indicators independently of quality messages at the second transmission rate”. Applicant submits:

Ling describes the estimating of received power, and the transmitting of a power control indicator which can be set to one or zero depending on whether transmitted power is to be increased or decreased. This is different to the use of a quality message in combination with a differential indicator as in claims 8, 11, 28.

DeMartin and Ling are both concerned with simple 1-bit closed-loop power control. The skilled person having consulted DeMartin would find nothing in DeMartin or Ling to suggest the use of a quality message either instead of, or additional to, the 1-bit power control of DeMartin. If he then consulted Ling, he would simply find the 1-bit power control method found in DeMartin. He would find no teaching in Ling to transmit the differential indicators with, not independently of, quality messages. The skilled person would therefore not arrive at the claimed features by consulting Chennakeshu, Kamel and Ling, as the Office Action suggests.

7A4) In light of the above arguments, applicant respectfully submits that since each combination of features which the Office Action states is present in a particular cited prior art document is not so present, the the skilled person could therefore not combine features in the cited prior art documents to arrive at the combination of claimed features in claims 8, 11, and 28. The combination of features of claims 8, 11, 28 is therefore both novel and non-obvious. Applicant therefore respectfully requests that claims 8, 11, 28 be allowed.

7B) Regarding claim 9:

The Office Action states that Chennakeshu et al. disclosed the feature claimed in claim 9:

“wherein the first time window is dynamically adjusted based on operation of the system”.

Applicant respectfully disagrees. Chennakeshu describes changing (e.g. halving) the value of M (M being a variable number of survival paths upon which trellis decoding is based), and employing a poor channel holding window (Δ) when the channel improves.

This set of features does not include the claimed feature since Chennakeshu does not specifically disclose a time window. The poor channel holding window of Chennakeshu is described as a number of stages Δ , not a time window.

Even if the poor channel holding window were interpreted as a time window, Chennakeshu merely states that initialization procedures are performed to select the poor channel holding window (col.9, lines 21-23) and does not mention dynamically adjusting the channel holding window based on operation of the system.

Therefore Chennakeshu does not disclose the feature of the first time window being dynamically adjusted based on operation of the system.

The applicant respectfully submits that claim 9 is therefore novel in its own right. Furthermore, provided that the Office Action agrees that claims 8, 11 and 28 are allowable, then claim 9 should also be allowable since it depends on claim 8. The applicant therefore respectfully requests that claim 9 be allowed.

7C) Regarding claim 15:

7C1) The Office Action states that Chennakeshu et al disclosed:

a wireless apparatus, comprising: processing unit, operative for executing computer-readable instructions; and a memory storage unit adapted to store a plurality of computer-readable instructions for: estimating a channel condition over a first time window; comparing the estimated channel condition to a first threshold value;

transmitting differential indicators based on the comparison and transmitting differential indicators with quality messages.

The applicant's amended claim reads as follows (using additional letters to identify sets of features):

- (a) A wireless apparatus, comprising: processing unit, operative for executing computer-readable instructions; and a memory storage unit adapted to store a plurality of computer-readable instructions for: estimating a channel condition over a first time window; comparing the estimated channel condition to a first threshold value;
- (b) determining a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators based on the comparison;
- (c) transmitting quality messages at the first transmission rate; and transmitting differential indicators at the second transmission rate independently of quality messages.

The Office Action has excluded the intermediate step represented by feature set (b), and also part of step (c). Even if the Office Action had included all features of step (c), step (c) relies on both steps (a) and (b), not merely on step (a) and therefore the analysis is unclear.

Notwithstanding the lack of clarity, Chennakeshu is concerned with simple 1-bit power control signals and does not disclose two different transmitted indications of link quality, whereas the claim does include two different transmitted indications of link quality which comprise the quality message and the differential indicators. Therefore claim 15 is novel over Chennakeshu.

7C2) The Office Action states that Chennakeshu et al. disclosed a method for "transmitting differential indicators with quality messages". Applicant interprets the Office Action as not clear, as explained below.

Firstly, claim 15 cites: "transmitting differential indicators at the second transmission rate independently of quality messages." These features are not the same as those cited by the Office Action.

Secondly, the Office Action stated earlier (in section 7(A)) that Chennakeshu and Kamel fail to positively disclose: transmitting the differential indicators with quality messages. This is opposite to the above statement that Chennakeshu et al. disclosed a method for “transmitting differential indicators with quality messages”, and hence is unclear.

Notwithstanding the above lack of clarity, Chennakeshu teaches (col.6 lines 30-36, col.12, lines 19-37, lines 46-54) to encode an information signal to be transmitted by a trellis code modulation and differential encoder, and by using diversity reception in conjunction with a variable-M decoding procedure, to adapt the complexity of the trellis decoding procedure in accordance with the current channel conditions.

This subject matter relates to the field of trellis decoding and not to the field of channel quality feedback as claim 15. There is no correspondence between this teaching of Chennakeshu and the features of claim 15. An advantage of transmitting differential indicators at the second transmission rate independently of quality messages is that quality messages may be transmitted less frequently and hence the quality messages use less resource and battery power. The teaching of Chennakeshu would not enable the skilled person to obtain this advantage.

7C3) The Office Action states that Chennakeshu et al. fails to disclose determining a first transmission rate for transmission of quality messages and a second transmission rate for transmitting differential indicators, and that Kamel discloses these features.

The applicant respectfully disagrees with the Office Action. Kamel does not disclose these features. Kamel describes the use of first and second incremental changes in transmit power of a base station. This feature is plainly not the same as the feature of a first transmission rate for transmission of quality messages and a second transmission rate for transmitting differential indicators.

Kamel teaches (col.9, lines 55 to 67, col.10, lines 1 to 30) the use of a 9.6 Kbps control channel and a second supplemental data channel that provides a high-rate burst channel for packets. Only the control channel is described in relation to power control and therefore power control can only be associated in Kamel with one rate (9.6Kbps), not two different rates.

Furthermore, Kamel states that downlink power control is needed to operate continuously on the control channel. In other words, it is not that the control channel is used for power control but that power control is needed to operate continuously on the control channel. Therefore the 9.6 Kbps control channel of Kamel is not associated with the feature:

“determining a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators...”

Therefore, both Chennakeshu and Kamel fail to disclose the claimed features:
“determining a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators based on the comparison.”

7C4) The Office Action, in arguing that claim 15 is obvious, admits that both Chennakeshu and Kamel fail to positively disclose

“wherein transmitting differential indicators based on the comparison and transmitting differential indicators independently of quality messages”

but that Ling disclosed

“a method for transmitting the differential indicators with quality messages”.

Applicant respectfully disagrees with the Office Action.

The Office Action is unclear in that firstly these two sets of features are not the same as each other and secondly the first set does not correspond to the claim wording. Claim 15 reads:

A wireless apparatus, comprising:

processing unit, operative for executing computer-readable instructions; and

a memory storage unit adapted to store a plurality of computer-readable instructions for:

estimating a channel condition over a first time window;

comparing the estimated channel condition to a first threshold value;

determining a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators based on the comparison;

transmitting quality messages at the first transmission rate; and

transmitting differential indicators at the second transmission rate independently of quality messages.

Notwithstanding the above lack of clarity, Ling teaches transmitting a power control indicator periodically based on comparing an estimate of received signal power to a threshold, and increasing or decreasing power based on the indicator, in order to maintain the signal-to-noise ratio of a particular mobile station above a pre specified value. (Abstract, col.5, lines 35-67, col.6, lines 1-21). Thus Ling is concerned with a single power control indicator, whereas claim 15 includes transmitting differential indicators and also quality messages.

Therefore, the claimed feature “transmitting differential indicators at the second transmission rate independently of quality messages” is not disclosed in Ling.

It follows that the skilled person having failed to find any teaching in Chennakeshu and Kamel directed to the claimed features, would not find any teaching in Ling to transmit differential indicators independently of quality messages, as stated in the Office Action. The skilled person would therefore not arrive at the claimed features by combining the teachings of Chennakeshu, Kamel and Ling, as the Office Action suggests.

In the light of the above arguments, claim 15 is novel and not obvious in relation to the cited references. Applicant therefore respectfully requests that claim 15 be allowed.

7D) Regarding claim 16:

7D1) The Office Action states that Chennakeshu et al disclosed:

“a wireless communication system supporting a plurality of carriers, and a method comprising: determining an average channel condition among the plurality of carriers.”

Applicant respectfully disagrees with the Office Action. Chennakeshu describes (col.8 lines 36 to 67) measuring channel quality using a number of channel quality indicators, an indicator which is averaged faded signal strength and may be obtained using a channel tracking algorithm, and a differentially encoded PSK system.

In Chennakeshu, measuring channel quality using a number of channel quality indicators is not the same as “determining an average channel condition among the plurality of carriers” of claim 16. Chennakeshu is concerned with measuring channel quality for a single channel and a single carrier using a number of channel quality indicators, and does not mention the use of multiple carriers, only the use of multiple channel quality indicators.

Therefore, Chennakeshu does not disclose “determining an average channel condition among the plurality of carriers”.

7D2) The Office Action states that Chennakeshu et al disclosed:

transmitting differential indicators based on the comparison and
transmitting differential indicators with quality messages.

The applicant's amended claim reads as follows (with reference letters added):

In a wireless communication system, the wireless communication system supporting a plurality of carriers, a method comprising:

- (a) determining an average channel condition among the plurality of carriers;
- (b) comparing the average channel condition to a first threshold value;
- (c) determining a first transmission rate for transmission of quality messages and a second transmission rate for the transmission of differential indicators based on the comparison;
- (d) transmitting quality messages at the first transmission rate; and
- (e) transmitting differential indicators at the second transmission rate independently of quality messages.

The applicant respectfully submits:

The Office Action has excluded the intermediate step represented by feature set (d) from the analysis, and also part of step (e) namely transmitting differential indicators at the second transmission rate. Even if the Office Action had included all features of step (e), step (e) relies on both steps (c) and (d), not merely on step (c) and therefore the analysis is unclear because step (e) could not be performed without steps (c) and (d).

Notwithstanding the above lack of clarity, Chennakeshu teaches to measure channel quality, compare the measured channel quality with a threshold and select a value of M based on the comparison (col.8), to encode an information signal to be transmitted by a trellis code modulation and differential encoder, and by using diversity reception in conjunction with a variable-M decoding procedure, to adapt the complexity of the trellis decoding procedure in accordance with the current channel conditions (col.6 lines 30-36, col.12, lines 19-37, lines 46-54).

The subject matter of Chennakeshu therefore relates to the field of trellis decoding and is not related to transmitting differential indicators at the second transmission rate independently of quality messages, the purpose of which is to provide link quality feedback. Chennakeshu does not disclose two transmitted indications of link quality (quality message and differential indicators), whereas claim 15 does include the quality message and differential indicators.

Therefore, Chennakeshu does not disclose the claimed features.

7D3) The Office Action admits that Chennakeshu et al. fails to disclose determining a first transmission rate for transmission of quality messages and a second transmission rate for transmitting differential indicators, and the Office Action states that Ling discloses these features.

Applicant respectfully disagrees with the Office Action. Ling describes the adjustment of a power control threshold as a function of a difference signal, a closed loop power control system, a base station estimating received signal power to produce a power estimate, comparing the power estimate to a threshold, generating an indicator (set to one or zero) based on the result of the comparison, encoding and transmitting the indicator, generating a difference signal by

subtracting the estimated received signal power from a predetermined reference signal power, means for detecting the indicator, and means for adjusting transmission power in response to the indicator.

There is no mention in Ling of determining a first transmission rate for transmission of quality messages and a second transmission rate for transmitting differential indicators. Ling is concerned with a simple closed-loop power control system using a single 1-bit power control signal which is not for indicating link quality information and which does not have two rates. The claimed features comprises two different means for indicating link quality information (the quality message and the differential indicators), each having a different rate.

It follows that Ling does not disclose transmitting quality messages at the first transmission rate and transmitting differential indicators at the second transmission rate.

7D4) The Office Action states that Kamel et al disclosed transmitting incremental change of the first and second quality measurement independently (col 5, lines 45-51).

The applicant respectfully disagrees with the Office Action. Firstly, the above feature of transmitting incremental change of the first and second quality measurement independently does not correspond to the claim wording. Claim 16 reads:

“...transmitting differential indicators at the second transmission rate independently of quality messages.”

Secondly, Kamel describes an incremental change in transmit power of a base station representing a desired change in the transmit power, which is proportional to a difference between a measured quality of service parameter and a recognized quality of service target. This does not include the feature of transmitting differential indicators at a second transmission rate, or the feature of transmitting differential indicators independently of quality messages. The quality of service parameter of Ling is a measure of quality of service which is measured in a receiver, but this is not the same as the quality message of the claim which is a message sent by the remote station based on a measured link quality.

Therefore, Ling does not disclose the claimed features.

7D5) The Office Action states that Chennakeshu and Kamel et al failed to disclose “transmitting differential indicators based on the comparison and transmitting differential indicators independently of quality messages.” and that Ling discloses:

“a method for transmitting the differential indicators with quality messages.”

The applicant respectfully disagrees with the Office Action.

Ling describes (col.5 lines 35 to 67, col.6 lines 1 to 20) a closed-loop power control system, a base station estimating received power, comparing the estimate to a threshold, transmitting a power control indicator which can be set to one or zero depending on whether transmitted power is to be increased or decreased, based on the result of the comparison, encoding and transmitting the indicator, a mobile station detecting the indicator and increasing or decreasing its transmitter power according to the indicator, a time delay of mobile station response, maintaining the average received power on a fixed level when instantaneous power tracking cannot be achieved, maintaining the signal to noise ratio of a particular mobile station above a pre specified value. This is not the same as the following features of claim 16:

“...transmission of differential indicators based on the comparison; transmitting quality messages ...; and transmitting differential indicators ... independently of quality messages.”

The arguments in section (7D4) apply to this section.

Furthermore, the above claimed features are taken out of the context of the rest of the claim, which reads:

In a wireless communication system, the wireless communication system supporting a plurality of carriers, a method comprising:

determining an average channel condition among the plurality of carriers;

comparing the average channel condition to a first threshold value;

determining a first transmission rate for transmission of quality messages and a second transmission rate for the transmission of differential indicators based on the comparison;

transmitting quality messages at the first transmission rate; and

transmitting differential indicators at the second transmission rate independently of quality messages.

The applicant respectfully submits that since the Office Action has taken certain features in isolation and out of context, the analysis is unclear. Notwithstanding the lack of clarity, since each set of features referred to by the Office Action is not present in the cited documents, the combination of those features cannot therefore be found in those documents. The person of average skill could therefore not obtain the features of claim 16 by drawing upon the teachings of those documents when the documents are taken either singly or in combination. Therefore claim 16 is both novel and non-obvious.

Therefore the applicant requests that, provided the Office Action agrees that claim 16 is novel and non-obvious, claim 16 should be allowed.

7E) Regarding claim 17:

The Office Action states Chennakeshu et al disclosed assigning a weight to each of the plurality of carriers, wherein the average channel condition is a weighted average.

The applicant respectfully disagrees with the Office Action. Chennakeshu describes (col 11, lines 32-56) weighting buffered received signals received on separate channels based on the signals' quality indicator and then combining the weighted signals. There is no mention in Chennakeshu of determining an average channel condition by assigning a weight to each of a plurality of carriers, wherein the average channel condition is a weighted average.

Claim 17 is therefore novel and contains advantageous features. The advantage of assigning a weight to each of the plurality of carriers, wherein the average channel condition is a weighted average, is that the C/I feedback is based on a weighted average among carriers rather than on one carrier.

Furthermore, since claim 17 has all the features of claim 16, then provided the Office Action agrees that claim 16 is allowable, claim 17 is also allowable. Applicant therefore respectfully requests that claim 17 be allowed.

7F) Regarding claim 20:

7F1) The Office Action states that Chennakeshu et al. disclosed

“a wireless apparatus comprising: a quality measurement unit configured to estimate a channel condition over a first time window.”

Applicant respectfully disagrees with the Office Action. There is no mention of a time window in Chennakeshu. Chennakeshu is directed to symbol decoding which is in a different field to that of the claimed features (channel quality feedback), and so the skilled person would not consult Chennakeshu either as a starting point or as a second reference, when seeking to improve channel quality feedback.

Nonetheless, if he did consult Chennakeshu, Chennakeshu describes: a receiver; a channel quality indicator; ways of measuring the channel quality indicator; a threshold for the channel quality indicator; a differential encoder; and setting a value of M based on comparing channel quality with the threshold wherein M is a variable number of survival paths upon which trellis decoding is based.

The differential encoder of Chennakeshu is for encoding a signal to be transmitted (col.6 lines 30-32). This is not the same as the differential indicators of claim 20 which track the quality metric between successive quality messages. The value of M is a variable number of survival paths for a trellis decoder (col.7, lines 49-59), which is not the same as comparing the estimated channel condition to a first threshold value for determining a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators.

Therefore, it follows that:

Chennakeshu does not contain the feature: “a wireless apparatus comprising: a quality measurement unit configured to estimate a channel condition over a first time window...”

7F2) The Office Action states that Chennakeshu et al disclosed
transmitting differential indicators based on the comparison and
transmitting differential indicators with quality messages.

Applicant respectfully disagrees with the Office Action. Claim 20 reads as follows (with reference letters added):

A wireless apparatus, comprising:

(a) a quality measurement unit configured to estimate a channel condition over a first time window;

(b) a differential analyzer configured to compare the estimated channel condition to a first threshold value; and

(c) a controller configured to determine a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators based on the comparison,

(d) the differential analyzer further configured to generate quality messages at the first transmission rate,

(e) the differential analyzer further configured to transmit differential indicators at the second transmission rate independently of quality messages.

The applicant respectfully submits that transmitting differential indicators with quality messages is not the same as transmitting differential indicators at the second transmission rate independently of quality messages, as implied by the Office Action.

Furthermore, the Office Action has excluded the intermediate steps represented by feature sets (c) and (d) from his analysis, and also part of step (e) namely transmitting differential indicators at the second transmission rate, making the analysis unclear. Even if the Office Action

had included all features of step (e), step (e) relies on both steps (c) and (d), and therefore the applicant submits that the analysis is unclear because step (e) cannot be performed without steps (c) and (d).

Furthermore, as explained above, Chennakeshu does not disclose the combination of the quality message and the differential indicators of claim 20.

7F3) The Office Action states that Kamel discloses (col.2 lines 15-65, col.5 lines 20 to 51, col.7 lines 31 to 60, col.9 lines 55 to 67, col.10 lines 1 to 30, Figs. 1 to 4): that the controller is configured to determine a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators based on the comparison, the differential analyzer further configured to generate quality messages at the first transmission rate, the differential analyzer further configured to transmit differential indicators at the second transmission rate independently of quality messages.

The applicant respectfully disagrees with the Office Action. Referring to Kamel (col.2 lines 15-65, col.5 lines 20 to 51, col.7 lines 31 to 60, col.9 lines 55 to 67, col.10 lines 1 to 30, Figs. 1 to 4): in Kamel, the first and second incremental changes in transmit power of a base station are not the same as a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators, because the first and second rates are transmission rates of quality message and differential indicators, and are not incremental changes in transmit power.

The quality message and differential indicators together provide updated link quality information, whereas the first and second incremental changes in transmit power are for changing the power level of two respective signals.

It follows that Kamel does not disclose the claimed features because Kamel fails to disclose a first transmission rate for transmission of quality messages and a second transmission rate for transmission of differential indicators.

7F4) The Office Action states that Kamel et al. disclosed transmitting incremental change of the first and second quality measurement independently (col 5, lines 45-51).

Arguments presented above apply here also. Kamel does not disclose two indications of link quality (quality message and differential indicators) but only a single quality measurement. Kamel does not disclose incremental change of quality measurement but describes incremental changes in transmit power, which are not the same as incremental change of quality measurement. Therefore Kamel does not disclose the claimed features.

7F5) The Office Action states that both Chennakeshu and Kamel fail to positively disclose

wherein transmitting differential indicators based on the comparison and transmitting differential indicators independently of quality messages

and that Ling disclosed

a method for transmitting the differential indicators with quality messages

The applicant submits that the above two sets of features are not the same as each other and so the analysis is unclear. Furthermore, notwithstanding this lack of clarity, the skilled person consulting Ling would not find teaching to transmit the differential indicators independently of quality messages. Ling teaches simple 1-bit power control as explained above, and does not describe the transmitting of two indications of link quality, i.e. the differential indicators and quality messages.

The skilled person would therefore not arrive at the claimed features by consulting Chennakeshu, Kamel and Ling, as the Office Action suggests.

The applicant respectfully submits that, in the light of the above arguments, claim 20 is novel and non-obvious over the cited documents, and the applicant requests that claim 20 be allowed.

7G) Regarding claims 21, 23, 29:

1) The applicant respectfully submits that, provided the Office Action accepts that claim 20 is allowable, then claim 21 should be allowed since it depends on claim 20.

2) The applicant respectfully submits that, provided the Office Action accepts that claim 11 is allowable, then claim 23 should be allowed since it depends on claim 11.

3) The applicant respectfully submits that, provided the Office Action accepts that claim 28 is allowable, then claim 29 should be allowed since it depends on claim 28.

Allowable Subject Matter

8. The Office Action stated that Claims 10, 22, 24, 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant respectfully submit that, provided the Office Action accepts that the rejections of those base claims have been fully addressed by the above arguments, thus rendering those base claims allowable, then claims 10, 22, 24 and 30 are also allowable. Applicant request that claims 10, 22, 24 and 30 be allowed.

Claims 13, 18, as amended, are now allowable over the prior art because the claim objection made in the last office action has been overcome by the above amendments to claims 13 and 18. Therefore, Applicant respectfully request these claims be allowed.

New claims 31 to 44

In the Office Action dated May 10 2007, the Office Action rejected claims 1-6 under 35 U.S.C. 102(b) as being anticipated by Bliss et al [US Pat: 4,633,441] (hereinafter "Bliss").

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." M.P.E.P. § 2131 (Aug. 2001) (quoting *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628,631,2 USPQ2d 1051,1053 (Fed. Cir. 1987)). "The identical claimed features must be shown in as complete detail as is contained in the ... claim." *Id.* (quoting *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236,9 USPQ2d 1051, 1053 (Fed. Cir. 1987)). In addition, "the reference must be

enabling and describe the applicant's claimed features sufficiently to have placed it in possession of a person of ordinary skill in the field of the claimed features." In re Paulsen, 30 F.3d 1475,1479,31 USPQ2d 1671,1673 (Fed. Cir. 1994).

New claim 31 is based on the features of original claim 5, which the Office Action indicated was anticipated by Bliss. Applicant respectfully submits that Bliss does not teach or suggest the features of claim 31. In particular, Bliss does not expressly or inherently describe:

generating quality messages at a first frequency, the quality messages providing information on the quality of a communication link;

generating a parity check for each of the quality messages, and

generating differential indicators at a second frequency, the differential indicators indicating changes in the quality of the communication link, wherein the second frequency is greater than the first frequency.

Bliss describes a link quality analyzer which measures the link quality between a calling station and a called station by continuously transmitting a plurality of signal tones. The called station receives the plurality of transmitting tones and obtains a power spectrum of the received tones from which various parameters of the channel (e.g. delay spread) and signal-to-noise ratio, are determined.

There is no mention in Bliss of "generating quality messages at a first frequency, the quality messages providing information on the quality of a communication link". The called station of Bliss automatically selects the best link based on measuring parameters of a signal it receives. To do this requires no interaction with the calling station and requires no message.

The provision, in the claimed features, of both the quality message and the differential indicator has the non-obvious advantage that the transmitter is provided with frequently updated channel condition information. Also, the use of a differential indicator has the non-obvious advantage of eliminating the need to frequently or continuously transmit the entire C/I.

Bliss describes (col 1, lines 64-67, col 2, lines 1-17) measuring link quality, measuring signal-to-noise ratio, automatically selecting a best link according to user-selectable criteria.)

Bliss then describes (col 2, lines 50-65, col.3 lines 1 to 57) measuring link quality, a transmitter and receiver joined by a communication channel, a processor evaluating a communication link, and waveform signals that are received and processed by the link quality analyzer.

Bliss also describes (col.4, lines 14-64) utilizing a single oscillator to provide four discrete frequencies for transmission, and a LQA signal processor which includes three basic units, a microcomputer 43, an analog-to-digital (AID) converter and filter section 45 and a Fast Fourier Transformer 47.

Bliss also describes (col.14, lines 33-55):-

“FIG. 12c is tied to FIG. 12d via tie points E and F, in which the final stage of the communication process is performed at block 285 and includes a dual loop system that includes loops 290 and loop 292. The calling station 200 will monitor ongoing communications at block 285 and at block 286 it will listen to ensure that the performance does not degrade beyond acceptable limits. This operation is performed primarily by the error code checking to insure that the error rate does not exceed pre-established limits. If it does exceed preestablished limits, then at block 287 the configuration is changed if information is available. If the information is not available then at block 288 a new LQA evaluation as per block 266 through 274 is performed. At block 289 the new configuration is established. If there is no degradation then the system through loop 290 proceeds to end of message transmission at decision block 299. If the end of message is not transmitted, then the loop 292 and tie points E will return back up to the beginning of block 285. If the end of message is received, then at block 247 the termination initiation instruction is transmitted and at block 246 the link is terminated and the system exits at 265.”

Applicant can see only one link between the above cited passage of Bliss and the features of claim 31, namely the use of a “message”. Unlike the claimed features, said message is not a quality message. It appears that the message of Bliss is only transmitted so that the link is terminated, i.e. the message is only described as for terminating the link. This is plainly different than the claimed features.

Applicant therefore respectfully submits that claim 31 is novel and non-obvious over Bliss and therefore allowable.

Applicant respectfully submits that the following claims are also allowable:

New claims 32-40 are allowable because they all depend either directly upon claim 31 or upon a claim which depends on claim 31, which is allowable.

Furthermore, noting that claim 32 is based on previously canceled claim 6, The Office Action dated May 10, 2007 rejected claims 1 to 6 under U.S.C. 102 (b) as being anticipated by Bliss et al. Applicant respectfully disagrees with the office action in this respect. There is no hint in Bliss or DeMartin of a quality message including carrier to interference information of a received signal at a receiver.

Also, noting that claim 33 is based on previously canceled claim 7, claim 7 was rejected under 35 U.S.C.103(a) as being unpatentable over Bliss et al. in view of DeMartin et al. Applicant respectfully disagrees with the office action in this respect.

The link quality analyzer of Bliss measures link quality by transmitting a plurality of signal tones, receiving the tones and determining parameters such as signal-to-noise ratio. There is no disclosure of a "differential indicator" or of a "differential indicator [which] is at least one bit". In Bliss, parameters of a received signal are determined but the parameters are not transmitted.

The down-link channel measurement bit of DeMartin is not described, so although it is a bit, its function is not clear other than it is a down-link channel measurement bit. Therefore the skilled person, having consulted Bliss and DeMartin, could not combine the features of Bliss and DeMartin to arrive at the claimed feature of claim 33.

New claim 41 is allowable for the same reasons that claim 31 is allowable.

New claims 42 and 43 are also allowable since they depend on claim 41. Applicant respectfully submits that the following claims are also allowable:

New claim 44 is allowable for the same reasons that claim 12 is allowable.

CONCLUSION

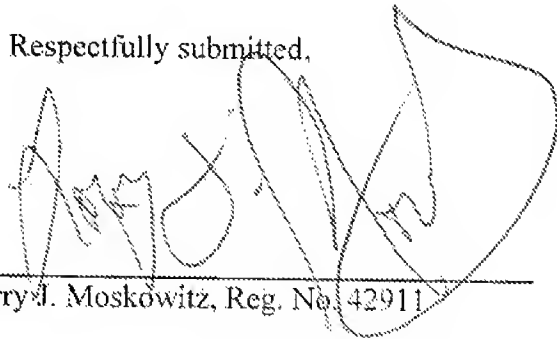
Applicant respectfully requests entry and consideration of the amendments and requests reconsideration and allowance of the application. Should any issues remain unresolved, the Office Action is encouraged to telephone the undersigned at the number provided below.

If it is determined that additional fees are due, the Commissioner is hereby authorized to charge payment of any fee(s) or any underpayment of fee(s) or credit any overpayment(s) to Deposit Account No. 17-0026. If necessary, Applicant request, under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application and to charge the fees for a large entity under 37 CFR 1.17(a).

Respectfully submitted,

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